

7-28-05

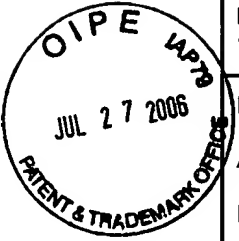
(FV)

PTO/SB/64 (10-05)

Approved for use through 07/31/2006. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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**PETITION TO WITHDRAW HOLDING OF ABANDONMENT UNDER 37 CFR 1.181**

 Docket Number (Optional)  
15-XZ-4971

First named inventor: Kenneth Scott Kump

Application No.: 09/344,190

Art Unit: 2624

Filed: June 24, 1999

Examiner: Duy M. Dang

Title: Method and Apparatus for Determining a Dynamic Range of a Digital Medical Image

**Mail Stop Issue Fee**

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

FAX: (571)273-8300

NOTE: If information or assistance is needed in completing this form, please contact  
Petitions Information at (571) 272-3282.

Applicant contends that above-identified application is not in fact abandoned. Therefore, Applicant requests withdrawal of the holding of abandonment based on the supplied evidence of response and follow-up by Applicant.

APPLICANT HEREBY PETITIONS FOR WITHDRAWAL OF THE HOLDING OF ABANDONMENT OF THIS APPLICATION

NOTE: A grantable petition requires the following items:

- (1) No Fee Required;
- (2) Sufficient Evidence to Show The Application Is Not Abandoned;

**Evidence**

A. The reply to the above-noted Office action in the form of An amendment and response to non-final office action (identify type of reply):

☒ has been filed previously on 5/17/04 and 6/4/04 ; and

☒ is enclosed herewith.

[Page 1 of 2]

This collection of information is required by 37 CFR 1.137(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

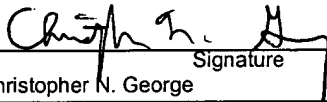
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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STATEMENT: Applicant contends that above-identified application is not in fact abandoned and a response was filed on May 17, 2004 and June 4, 2004. Therefore, Applicant requests withdrawal of the holding of abandonment based on the supplied evidence of response and follow-up by Applicant.

**WARNING:**

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

  
Signature

Christopher N. George

Typed or printed name

July 27, 2006

Date

51,728

Registration Number, if applicable

McAndrews, Held & Malloy, Ltd

Address

312-775-8000

Telephone Number

500 West Madison Street, Suite 3400, Chicago, IL 60661

Address

Enclosures: ☐ Fee Payment

☒ Reply

☐ Terminal Disclaimer Form

☒ Additional sheets containing statements establishing no abandonment

☐ Other : \_\_\_\_\_

**CERTIFICATE OF MAILING OR TRANSMISSION [37 CFR 1.8(a)]**

I hereby certify that this correspondence is being:

☒ Deposited with the United States Postal Service on the date shown below with sufficient postage as Express Mail with Label No. EV 729160515 US in an envelope addressed to: Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

☐ Transmitted by facsimile on the date shown below to the United States Patent and Trademark Office at (571)273-8300.

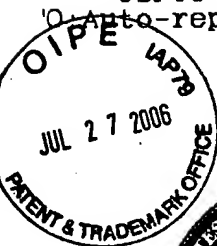
July 27, 2006

Date

  
Signature

Christopher N. George

Typed or printed name of person signing certificate



## Auto-Reply Facsimile Transmission

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Received  
Cover  
Page

=====&gt;

FROM McANDREWS, HEID &amp; MALLOY

(TUE) 6/13/06 12:07:57 12:06/NO 455:050406 F 1



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CHRIS GEORGE

TELEPHONE: (312) 775-8000

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TO:	Duy M. Dang	FAX NO.:	571-273-8300
FROM:	Chris George	USER ID:	8288
CLIENT:	1194	MATTER:	12437US01

Number of Pages This Transmission (Including Cover Page): 27

I hereby certify that the attached Amendment is being facsimile transmitted to the United States Patent and Trademark Office on June 13, 2006

Christopher N. George

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G.E. Docket No. 15-XZ-4971 (MHM 12437US01)

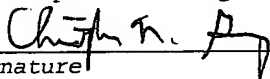
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Application of:	)	Examiner: Duy M. Dang
	)	
Kenneth Kump	)	Group Art Unit: 2625
	)	
Serial No. : 09/344,190	)	
	)	
Filed: 6/24/1999	)	
	)	
For: METHOD AND APPARATUS FOR	)	
DETERMINING A DYNAMIC RANGE OF	)	
A DIGITAL MEDICAL IMAGE	)	

CERTIFICATION OF FACSIMILE TRANSMISSION

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Christopher N. George

  
Signature

**RETRANSMISSION OF FILINGS**

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Examiner Dang:

As we discussed on the phone, I am attaching a copy of our last several filings in the above-identified pending patent application. We had previously sent a status request with no response, and our paralegals have been taking with Examiner Choobin, who previously had this case, to try to ascertain its status, since it has been so long since we've received any communication from the PTO regarding this file. As you'll see from the attachments, we filed an amendment and response on May 17, 2004. We received a notice of non-compliant amendment on June 1, 2004, and were asked to resubmit the "Amendments to the Claims" section because claim 17 was incorrectly

labeled as "Previously Amended" rather than "Previously Presented." As you'll see from the attachments, we submitted a corrected "Amendments to the Claims" section with a corrected status of "Previously Presented" for claim 17 on June 4, 2004. We submitted a status inquiry on January 25, 2005, and followed up with phone calls on January 20, 2006 and March 10, 2006.

Attached are the following materials:

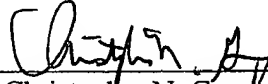
1. Amendment and Response dated May 17, 2004
2. Retransmission of "Amendments to the Claims" section dated June 4, 2004 as requested by the Notice of Non-Compliant Amendment
3. Status Inquiry dated January 25, 2005.

Based on the Applicant's amendment and response and previous comments from Examiner Choobin, the Applicant submits that the claims pending in the application should be in condition for allowance, and action to that effect, with the associated PTA, is respectfully requested. If the Examiner has any questions or would like to discuss anything further, he is invited to contact the Applicant at the phone number below.

No fees are believed to be due, but the Commissioner for Patents is authorized to charge any additional fees or credit overpayment to the Deposit Account of GTC, Account No. 070845.

Respectfully submitted,

Date: June 13, 2006

By:   
Christopher N. George  
Reg. No. 51,728

McANDREWS, HELD & MALLOY, LTD.  
500 West Madison Street, Suite 3400  
Chicago, Illinois 60661  
Telephone: (312) 775-8000



Customer Number: 23446  
Attorney Docket No. 15-XZ-4971

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Application of:

Kump

Serial No. 09/344,190

Filed: June 24, 1999

For: Method and apparatus for Determining  
a Dynamic Range of A Digital Medical  
Image

Examiner: B. Choobin

Group Art Unit: 2625

Confirmation No. 8765

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January 25, 2005

Christopher N. George  
Reg: No.: 51,728  
Attorney for Applicant

STATUS INQUIRY

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

More than seven months have passed since the filing of a response (faxed June 4, 2004) to a Notice of Non-Compliant Amendment dated May 26, 2004. No further communication has been received from the Patent and Trademark Office indicating action on this application.

Kindly advise the undersigned of the present status of this application by checking the appropriate box below. A stamped return-addressed envelope is provided.

Respectfully submitted,

Dated: January 25, 2005

  
Christopher N. George  
Reg. No. 51,728  
Attorney for applicant

McAndrews, Held & Malloy, Ltd.  
34<sup>th</sup> Floor  
500 West Madison Street  
Chicago, IL 60661  
312/775-8000

Applicant: Kump  
Serial No. 09/344,190  
Filed: June 24, 1999  
Group Art Unit: 2625  
Confirmation No. 8765

Our Reference: 15-XZ-4971  
(12437US01)

Title: Method and apparatus for Determining a Dynamic Range of A Digital Medical Image

### STATUS INQUIRY REPLY

APPLICATION SERIAL NO. 09/344,190 IS CURRENTLY

- ☐ Assigned to group 2625 and awaits:
- ☐ Action by Examiner Choobin
- ☐ The Status Of The Patent Application Is As Follows:

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\_\_\_\_\_  
Date

\_\_\_\_\_  
SIGNATURE OF PTO EMPLOYEE

Name: \_\_\_\_\_

Title: \_\_\_\_\_



ASSISTANT COMMISSIONER FOR PATENTS

Sir: Please place the USPTO receipt stamp hereon and place in outgoing mail to acknowledge receipt of:

Docket No: 15-x2-4971 (124374801)

Applicant: Kump

Serial No.: 09/344,190

Filed: June 24, 1999

☒ Transmittal: Status Inquiry

☐ Fee \$ \_\_\_\_\_

☐ Patent Application including:

☐ Page(s) Cover Sheet

☐ Page(s) Specification

☐ Page(s) Claims # \_\_\_\_\_

☐ Page(s) Abstract

☐ Page(s) Drawings Formal Informal

☐ Response to Notice of Missing Parts \_\_\_\_\_

☐ Declaration & POA Signed Unsigned

☐ Amendment \_\_\_\_\_ Page(s)

☐ Assignment \_\_\_\_\_ Page(s) Cover Sheet \_\_\_\_\_ Page(s)

☐ IDS with PTO-1449 \_\_\_\_\_ Page(s)

☐ Cited References

☐ Other \_\_\_\_\_

ASSISTANT COMMISSIONER FOR PATENTS

Sir: Please place the USPTO receipt stamp hereon and place in outgoing mail to acknowledge receipt of:

Docket No: 15-x2-4971 (124374801)

Applicant: Kump

Serial No.: 09/344,190

Filed: June 24, 1999

☒ Transmittal: Status Inquiry

☐ Fee \$ \_\_\_\_\_

☐ Patent Application including:

☐ Page(s) Cover Sheet

☐ Page(s) Specification

☐ Page(s) Claims # \_\_\_\_\_

☐ Page(s) Abstract

☐ Page(s) Drawings Formal Informal

☐ Response to Notice of Missing Parts \_\_\_\_\_

☐ Declaration & POA Signed Unsigned

☐ Amendment \_\_\_\_\_ Page(s)

☐ Assignment \_\_\_\_\_ Page(s) Cover Sheet \_\_\_\_\_ Page(s)

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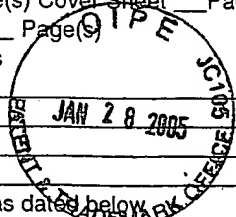
Dated: January 25, 2005

Respectfully: **McANDREWS, HELD & MALLOY, LTD.**

Attorneys for Applicant

Certificate of Mailing as dated below  
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Dated: January 25, 2005  
Respectfully: **McANDREWS, HELD & MALLOY, LTD.**  
Attorneys for Applicant







\*\*\*\*\*  
TRANSMISSION REPORT  
\*\*\*\*\*

RI; JUN 4 2004 12:05  
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## FAX COVER LETTER

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TO: Examiner, Barry Choobin

FROM: Christopher N. George USER ID: 8288

DATE: June 4, 2004

FAX NO.: (703) (708) 746-5934

CLIENT: 1194

MATTER: 12437US01 (GE Docket No. 15-XZ-4971)

Number of Pages This Transmission (Including Cover Page): 7

Message: Dear Examiner Choobin:

Re: Office Action response for Application No. 09/344,190.

*If you have problems receiving this facsimile transmission, please contact the sender at the above telephone number.*



### AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method for determining a dynamic range of a digital medical image for a medical imaging system, the digital medical image containing a clinical region, comprising:

dividing a digital medical image into at least two bands of predetermined width;

generating a profile for each of said at least two bands of predetermined width;

determining whether the digital medical image within said at least two bands includes at least one non-clinical region based on said profile;

masking said at least one non-clinical region based on at least one of gray scale maximum and minimum values for the at least one non-clinical region, said at least one non-clinical region comprising one of a raw radiation region and a collimated region; and

calculating a dynamic range based on a clinical region within each of said at least two bands.

2. (Cancelled).

3. (Previously Presented) The method of claim 1, wherein the dividing step further comprises dividing the digital medical image into one of horizontal and vertical bands.

4. (Original) The method of claim 1, further comprising:

differentiating said digital medical image, said determining step calculating a position of the non-clinical region based on a result of said differentiation.

5. (Original) The method of claim 1, further comprising:

calculating at least one threshold based on a dynamic range of the digital medical image, said at least one threshold being used to identify at least one of maximum and minimum values for the non-clinical region.

6. (Previously Presented) The method of claim 1, wherein said determining step discriminates at least one of histogram maximum and minimum values for a non-clinical region based on at least one predetermined threshold.

7. (Original) The method of claim 1, further comprising:

when a non-clinical region is determined to exist, masking the non-clinical region from the digital medical image before calculating said dynamic range.

8. (Cancelled).

9. (Previously Presented) The method of claim 1, further comprising:

generating a histogram of the digital medical image; and

masking gray scale levels from the histogram that exceed predetermined upper and lower thresholds.

10. (Original) The method of claim 1, wherein said determining step determines that the digital medical image does not include a non-clinical region and said calculating step calculates a dynamic range of the entire digital medical image as the clinical region.

11. (Currently Amended) A medical diagnostic imaging system for controlling a dynamic range of a digital medical image to be displayed, comprising:

a segmentation module identifying clinical and non-clinical regions within a digital medical image, said non-clinical regions comprising at least a collimated region;

a processor dividing the digital medical image into at least two bands, wherein said processor is capable of masking at least one non-clinical region based on at least one of gray scale maximum and minimum values for the at least one non-clinical region, the at least one non-clinical region comprising at least one of a raw radiation region and a collimated region; and

a dynamic range module determining a dynamic range of a clinical region of the digital medical image based on the clinical region, said dynamic range module determining a dynamic range of said clinical region within said at least two bands, said dynamic range module computing dynamic range characteristics based on said dynamic range, said dynamic range characteristics capable of adjusting said digital medical image.

12. (Previously Presented) The system of claim 11, further comprising a digital detector obtaining said digital medical image having said clinical and non-clinical regions.

13-14. (Cancelled).

15. (Previously Presented) The system of claim 11, wherein the segmentation module identifies said non-clinical regions based on variations in gray scale levels of the digital medical image.

16. (Previously Presented) The system of claim 11, wherein the segmentation module differentiates at least a portion of the digital medical image to identify the non-clinical regions.

17. (Previously Presented) The system of claim 11, wherein the segmentation module discriminates the non-clinical regions based on at least one gray scale threshold value.

18. (Previously Presented) The system of claim 11, further comprising a processor calculating at least one threshold based on a dynamic range of the digital medical image, said segmentation module discriminating the non-clinical regions based on said threshold.

19. (Previously Presented) The system of claim 11, said dynamic range module including a processor masking over said non-clinical regions when determining the dynamic range of the clinical region.

20. (Previously Presented) The system of claim 11, further comprising a processor calculating at least one of a maximum and minimum gray scale level for the digital medical image in order to identify the non-clinical regions.

21. (Previously Presented) The system of claim 11, further comprising a processor calculating at least one of maximum and minimum gray scale levels for the clinical region in order to determine the dynamic range of the clinical region.

22. (Previously Presented) The system of claim 11, further comprising a processor generating a histogram of at least a portion of the digital medical image to identify gray scale levels associated with said non-clinical regions.

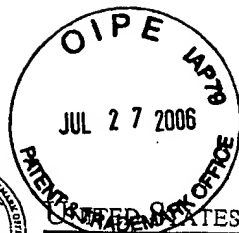
23. (Previously Presented) The system of claim 11, wherein the segmentation module masks said non-clinical regions identified in the digital medical image.

24. (Previously Presented) The system of claim 11, wherein the segmentation module determines that the digital medical image does not include said non-clinical regions, said dynamic range module using the digital medical image to determine said dynamic range of the digital medical image.

25. (Previously Presented) The method of claim 1, further comprising differentiating said digital medical image, said determining step calculating positions of first and second non-clinical regions based on a result of said differentiation, said first and second non-clinical regions comprising raw radiation data and collimated data, respectively.

26. (Cancelled).

27. (Previously Presented) The system of claim 11, further comprising a processor dividing said digital medical image into at least two bands, wherein said at least two bands comprise one of horizontal and vertical bands, said dynamic range module determining a dynamic range of said clinical region within said at least two bands.

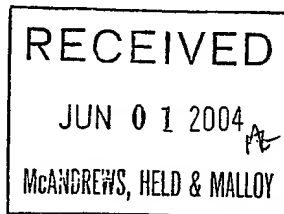


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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/344,190	06/24/1999	KENNETH SCOTT KUMP	15-XZ-4971	8765

759D 05/26/2004  
DEAN D SMALL  
MCANDREW HELD & MALLOY LTD  
34TH FLOOR  
500 W MADISON STREET  
CHICAGO, IL 60661



EXAMINER

CHOOBIN, BARRY

ART UNIT PAPER NUMBER

2625

DATE MAILED: 05/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

RESPONSE DUE:

June 14, 2004



UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS  
UNITED STATES PATENT AND TRADEMARK OFFICE  
P.O. Box 1450  
ALEXANDRIA, VA 22313-1450  
www.uspto.gov

Paper No.

Notice of Non-Compliant Amendment (37 CFR 1.121)

The amendment document filed on 5-17-04 is considered non-compliant because it has failed to meet the requirements of 37 CFR 1.121, as amended on June 30, 2003 (see 68 Fed. Reg. 38611, Jun. 30, 2003). In order for the amendment document to be compliant, correction of the following item(s) is required. Only the corrected section of the non-compliant amendment document must be resubmitted (in its entirety), e.g., the entire "Amendments to the claims" section of applicant's amendment document must be re-submitted. 37 CFR 1.121(h).

THE FOLLOWING CHECKED (X) ITEM(S) CAUSE THE AMENDMENT DOCUMENT TO BE NON-COMPLIANT:

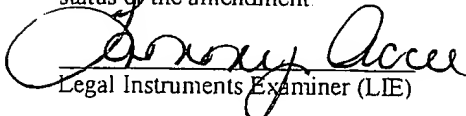
- ☐ 1. Amendments to the specification:
- ☐ A. Amended paragraph(s) do not include markings.
  - ☐ B. New paragraph(s) should not be underlined.
  - ☐ C. Other \_\_\_\_\_
- ☐ 2. Abstract:
- ☐ A. Not presented on a separate sheet. 37 CFR 1.72.
  - ☐ B. Other \_\_\_\_\_
- ☐ 3. Amendments to the drawings: \_\_\_\_\_
- ☒ 4. Amendments to the claims:
- ☐ A. A complete listing of all of the claims is not present.
  - ☐ B. The listing of claims does not include the text of all claims (including withdrawn claims)
  - ☐ C. Each claim has not been provided with the proper status identifier, and as such, the individual status of each claim cannot be identified.
  - ☐ D. The claims of this amendment paper have not been presented in ascending numerical order.
  - ☒ E. Other: claim 17 has an incorrect status identifier.

For further explanation of the amendment format required by 37 CFR 1.121, see MPEP Sec. 714 and the USPTO website at <http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/officeflyer.pdf>.

If the non-compliant amendment is a **PRELIMINARY AMENDMENT**, applicant is given ONE MONTH from the mail date of this letter to supply the corrected section which complies with 37 CFR 1.121. Failure to comply with 37 CFR 1.121 will result in non-entry of the preliminary amendment and examination on the merits will commence without consideration of the proposed changes in the preliminary amendment(s). This notice is not an action under 35 U.S.C. 132, and this ONE MONTH time limit is not extendable.

If the non-compliant amendment is a reply to a **NON-FINAL OFFICE ACTION** (including a submission for an RCE), and since the amendment appears to be a *bona fide* attempt to be a reply (37 CFR 1.135(c)), applicant is given a TIME PERIOD of ONE MONTH from the mailing of this notice within which to re-submit the corrected section which complies with 37 CFR 1.121 in order to avoid abandonment. **EXTENSIONS OF THIS TIME PERIOD ARE AVAILABLE UNDER 37 CFR 1.136(a).**

If the amendment is a reply to a **FINAL REJECTION**, this form may be an attachment to an Advisory Action. The period for response to a final rejection continues to run from the date set in the final rejection, and is not affected by the non-compliant status of the amendment.

  
Legal Instruments Examiner (LIE)

703-305-8269  
Telephone No.



Customer Copy  
Label 11-F June 2002



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Attorneys for Applicant

CNG/mms

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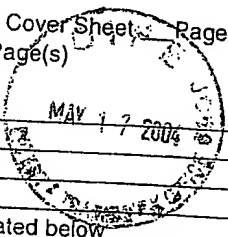
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TRANSMITTAL FORM		Application Number	
(to be used for all correspondence after initial filing)		09/344,190	
		Filing Date	
		June 24, 1999	
		First Named Inventor	
		Kenneth Kump	
		Group Art Unit	
		2625	
		Examiner Name	
		B. Choobin	
Total Number of Pages in This Submission		Attorney Docket Number	
10		15-XZ-4971(12437US01)	
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Firm or Individual Name	McAndrews Held & Malloy, Ltd.		
Name (Print/type)	Christopher N. George	Registration No. (Attorney/Agent)	51,728
Signature			Date: May 17, 2004
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Date of Deposit May 14, 2004.			



G.E. Docket No. 15-XZ-4971 (MHM 12437US01)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Application of:	)	Examiner: B. Choobin
	)	
Kenneth Kump	)	Group Art Unit: 2625
	)	
Serial No. : 09/344,190	)	
	)	<u>EV 303832315 US</u>
Filed: 6/24/1999	)	Express Mail Number
	)	
For: METHOD AND APPARATUS FOR	)	
DETERMINING A DYNAMIC RANGE OF	)	<u>May 17, 2004</u>
A DIGITAL MEDICAL IMAGE	)	Date
	)	
	)	
	)	

AMENDMENT

Mail Stop Non-Fee Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Examiner Choobin:

The following is in response to the Office Action mailed February 17, 2004. The Amendment and Response is being timely submitted within the three-month date of May 17, 2004. The Applicant respectfully requests that the following Amendments and Remarks be entered and considered.

### AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method for determining a dynamic range of a digital medical image for a medical imaging system, the digital medical image containing a clinical region, comprising:

dividing a digital medical image into at least two bands of predetermined width;

generating a profile for each of said at least two bands of predetermined width;

determining whether the digital medical image within said at least two bands includes at least one non-clinical region based on said profile;

masking said at least one non-clinical region based on at least one of gray scale maximum and minimum values for the at least one non-clinical region, said at least one non-clinical region comprising one of a raw radiation region and a collimated region; and

calculating a dynamic range based on a clinical region within each of said at least two bands.

2. (Cancelled).

3. (Previously Presented) The method of claim 1, wherein the dividing step further comprises dividing the digital medical image into one of horizontal and vertical bands.

4. (Original) The method of claim 1, further comprising:

differentiating said digital medical image, said determining step calculating a position of the non-clinical region based on a result of said differentiation.

5. (Original) The method of claim 1, further comprising:

calculating at least one threshold based on a dynamic range of the digital medical image, said at least one threshold being used to identify at least one of maximum and minimum values for the non-clinical region.

6. (Previously Presented) The method of claim 1, wherein said determining step discriminates at least one of histogram maximum and minimum values for a non-clinical region based on at least one predetermined threshold.

7. (Original) The method of claim 1, further comprising:

when a non-clinical region is determined to exist, masking the non-clinical region from the digital medical image before calculating said dynamic range.

8. (Cancelled).

9. (Previously Presented) The method of claim 1, further comprising:

generating a histogram of the digital medical image; and

masking gray scale levels from the histogram that exceed predetermined upper and lower thresholds.

10. (Original) The method of claim 1, wherein said determining step determines that the digital medical image does not include a non-clinical region and said calculating step calculates a dynamic range of the entire digital medical image as the clinical region.

11. (Currently Amended) A medical diagnostic imaging system for controlling a dynamic range of a digital medical image to be displayed, comprising:

a segmentation module identifying clinical and non-clinical regions within a digital medical image, said non-clinical regions comprising at least a collimated region;

a processor dividing the digital medical image into at least two bands, wherein said processor is capable of masking at least one non-clinical region based on at least one of gray scale maximum and minimum values for the at least one non-clinical region, the at least one non-clinical region comprising at least one of a raw radiation region and a collimated region; and

a dynamic range module determining a dynamic range of a clinical region of the digital medical image based on the clinical region, said dynamic range module determining a dynamic range of said clinical region within said at least two bands, said dynamic range module computing dynamic range characteristics based on said dynamic range, said dynamic range characteristics capable of adjusting said digital medical image.

12. (Previously Presented) The system of claim 11, further comprising a digital detector obtaining said digital medical image having said clinical and non-clinical regions.

13-14. (Cancelled).

15. (Previously Presented) The system of claim 11, wherein the segmentation module identifies said non-clinical regions based on variations in gray scale levels of the digital medical image.

16. (Previously Presented) The system of claim 11, wherein the segmentation module differentiates at least a portion of the digital medical image to identify the non-clinical regions.

17. (Previously Amended) The system of claim 11, wherein the segmentation module discriminates the non-clinical regions based on at least one gray scale threshold value.

18. (Previously Presented) The system of claim 11, further comprising a processor calculating at least one threshold based on a dynamic range of the digital medical image, said segmentation module discriminating the non-clinical regions based on said threshold.

19. (Previously Presented) The system of claim 11, said dynamic range module including a processor masking over said non-clinical regions when determining the dynamic range of the clinical region.

20. (Previously Presented) The system of claim 11, further comprising a processor calculating at least one of a maximum and minimum gray scale level for the digital medical image in order to identify the non-clinical regions.

21. (Previously Presented) The system of claim 11, further comprising a processor calculating at least one of maximum and minimum gray scale levels for the clinical region in order to determine the dynamic range of the clinical region.

22. (Previously Presented) The system of claim 11, further comprising a processor generating a histogram of at least a portion of the digital medical image to identify gray scale levels associated with said non-clinical regions.

23. (Previously Presented) The system of claim 11, wherein the segmentation module masks said non-clinical regions identified in the digital medical image.

24. (Previously Presented) The system of claim 11, wherein the segmentation module determines that the digital medical image does not include said non-clinical regions, said dynamic range module using the digital medical image to determine said dynamic range of the digital medical image.

25. (Previously Presented) The method of claim 1, further comprising differentiating said digital medical image, said determining step calculating positions of first and second non-clinical regions based on a result of said differentiation, said first and second non-clinical regions comprising raw radiation data and collimated data, respectively.

26. (Cancelled).

27. (Previously Presented) The system of claim 11, further comprising a processor dividing said digital medical image into at least two bands, wherein said at least two bands comprise one of horizontal and vertical bands, said dynamic range module determining a dynamic range of said clinical region within said at least two bands.



## REMARKS

Claims 1, 3-7, 9-12, 15-25 and 27 are pending in the present application. Claims 1, 3-7, 9-12, 15-25 and 27 have been rejected by the Examiner. By this Response, claims 1 and 11 have been amended as discussed with the Examiner. The Applicant respectfully submits that the pending claims define allowable subject matter.

Claims 1, 3-7, 9-12, 15-25 and 27 were rejected under 35 U.S.C. § 103(a) as being anticipated by Ergun et al. (USP 6,298,109) in view of Friemel (USP 6,162,174).

Friemel relates to dividing a plurality of images into segments of image data in order to track objects in motion between the plurality of images (col. 3, lines 47-66, Figures 3 and 4). Friemel uses segments to compare certain segments between successive images. Friemel constructs a movement vector to describe movement of an object from one segment into another segment (col. 3, lines 64-67 and col. 4, lines 1-43). Thus, the multiple segments describe and are intended to be used as usable, valid image data, not reference. No distinction between clinical and non-clinical data is made, and no masking is performed or contemplated. On the contrary, Friemel determines movement of an object with respect to adjacent images (col. 5, lines 8-27). Then, an interpolated image is created from adjacent images scaled by the movement vectors (col. 5, lines 8-38).

The portion of Friemel cited by the Examiner, column 3, lines 45-63, as well as Friemel in its entirety, does not mention or suggest dividing an image into at least two bands including at least one non-clinical region. Segments in Friemel are all clinical regions used to illustrate movement, as discussed through Friemel. No distinction between clinical and non-clinical regions is contemplated in Friemel, and no masking is ever mentioned. No dynamic range calculation is performed in Friemel based on a clinical region within the bands.

Thus, Friemel is distinct and different from the claimed invention. Friemel does not disclose determining whether a digital medical image within at least two bands includes at least one non-clinical region (col. 3, lines 45-63). Friemel tracks object movement but does not address or

contemplate a distinction between clinical and non-clinical regions. No masking is performed in Friemel. Additionally, Friemel does not identify clinical and non-clinical regions within a digital medical image. The processor of Friemel also does not contemplate masking non-clinical regions or determining the dynamic range of a clinical region. These limitations are recited in claims of the present application.

As previously discussed, Ergun relates to a system for voltage and current adjustment for an x-ray tube based on two exposures at different voltages (Abstract; col. 2, lines 60-65). A generalized image transformation polynomial is used to remove image distortion and rotate the image (Abstract; col. 3, lines 38-52). A scatter map may also be calculated to reduce scatter in the image (Abstract).

Ergun relates to a C-arm x-ray system in which the x-ray tube is connected to an x-ray tub power supply which separately controls the current and voltage to the x-ray tube based on signals received from a computer (col. 7, lines 12-25). A charge couple device (CCD) camera provides digital radiation values to the computer for processing (col. 7, lines 31-67). The computer compares the current image pixels to the last pixels obtained from the image (col. 8, lines 10-15). A difference between the pixel values reflects a difference in the amount of x-ray flux received at the CCD camera (col. 8, lines 15-20). The difference is mapped to a weight between zero and one (col. 8, lines 15-21). The weighted pixels may be used to reduce noise in the image (col. 8, lines 22-58).

Ergun also remaps data from the CCD camera to the image to correct for pincushion-type distortion (col. 9, lines 15-18). Parameters may be used to reduce distortion and rotate the image with polynomials and pixel shift information (col. 9, lines 40-67; col. 10, lines 1-13). Radiation data may then be mapped to pixel brightness using a second transformation (col. 10, lines 48-60). Ergun further controls the fluence of the x-ray beam as a function of tissue density to control exposure and noise (col. 10, lines 63-67; col. 11, lines 1-10).

Additionally, the system of Ergun attempts to eliminate "background pixels" by binning pixels from the CCD camera according to their values to create a multiple peaked plot (col. 11,

lines 13-32). Pixels associated with a certain value are removed from the exposure rate calculation (col. 11, lines 54-61). Then, the exposure rate is calculated based on the values of the remaining pixels, and an amperage and voltage value are transmitted to the x-ray tube power supply (col. 11, lines 62-66). Background pixel elimination is based on the type of material being imaged (col. 15, lines 6-10).

Scatter reduction may also be pursued in Ergun used two images obtained at different x-ray energies (col. 15, lines 33-45). A scatter map may be formed using an occluder with a plurality of x-ray blocking lead pins (col. 15, lines 66-67; col. 16, lines 1-40). The scatter map is normalized and subtracted from the image to reduce scatter in the image (col. 16, lines 57-67; col. 17, lines 1-2).

Ergun does not discuss dividing or segmenting an image. As stated by the Examiner, Ergun does not teach or suggest determining whether a digital medical image with the at least two bands includes at least one non-clinical region. Rather than dividing an image into bands, Ergun looks at background or scatter pixels scattered randomly throughout the image. Further, Ergun does not mask non-clinical regions identified in one or more bands of an image. Ergun simply does not divide or band an image but rather focuses on eliminating individual pixels in the image (see, for example, columns 11 and 12). The attenuation and non-attenuation regions of the image are defined as general regions and are mentioned in relation to a scatter map, rather than masking non-clinical regions and calculating dynamic range of a digital medical image, as recited in claims of the present application.

Ergun, as shown in Figure 11, for example, does not differentiate between clinical and non-clinical regions in bands of an image. Ergun does not mask non-clinical regions. And Ergun does not compare grayscale values to mask non-clinical regions in at least one band of an image.

Furthermore, independent claim 1 has been amended by this response. Amended claim 1 recites the limitations of generating a profile for each of the two or more bands of predetermined width and determining whether the digital medical image within the two or more bands includes at

least one non-clinical region based on the profile. Neither Ergun nor Friemel teach or suggest generating a profile or determining a non-clinical region based on the profile. Therefore, the Applicant respectfully submits that independent claim 1 and its dependent claims should be allowable.

Additionally, independent claim 11 has been amended by this response. Amended claim 11 recites the limitation that the dynamic range module computes dynamic range characteristics based on the dynamic range, wherein the dynamic range characteristics are capable of adjusting the digital medical image. Neither Ergun nor Friemel teach or suggest computing dynamic range characteristics based on the dynamic range, wherein the dynamic range characteristics are capable of adjusting the digital medical image. Therefore, the Applicant respectfully submits that independent claim 11 and its dependent claims should be allowable.

Thus, as illustrated above, the limitations of the claimed invention simply are not present in Ergun and are not even suggested by Ergun. Even bringing in Friemel and arguing that one of ordinary skill in the art would combine Ergun with Friemel does not cure the defects left by Ergun when compared to the claimed invention. For example, as discussed above, Ergun does not teach or suggest determining whether a digital medical image within at least two bands include at least one non-clinical region. Furthermore, Friemel does not teach or suggest such a determination of one or more non-clinical regions but rather tracks an object among a plurality of segments in adjacent images to determine a movement vector. Thus, this and other limitations of the claimed invention are not taught nor are they suggested by the cited art. Therefore, the Applicant respectfully submits that the claims of the present application are allowable. The Applicant respectfully requests an action to that effect.

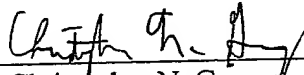
**CONCLUSION**

The Applicant respectfully submits that the pending claims define allowable subject matter. Should anything remain in order to place the present application in condition for allowance, the Examiner is kindly invited to contact the undersigned at the telephone number listed below.

Please charge any additional fees or credit overpayment to the Deposit Account of McAndrews, Held & Malloy, Ltd., Account No. 070845.

Respectfully submitted,

Date: May 17, 2004

By:   
Christopher N. George  
Reg. No. 51,728

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